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09/876,522	06/07/2001	Charles Cohn	COHN 9	9236

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EXAMINER

MUTSCHLER, BRIAN L

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 06/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/876,522

Applicant(s)

COHN, CHARLES

Examiner

Brian L. Mutschler

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 21-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Comments

1. The rejections of claims 1-14 and 21-24 under 35 U.S.C. 103 over Lim as the primary reference have been overcome by Applicant's amendment. The method of Lim does not disclose or suggest the formation of the plating layer on the sides of the openings in the dielectric layers.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 9, 2003 has been entered.

Claim Objections

3. Claim 1 is objected to because of the following informalities:
- a. In claim 1 at line 8, please change "one" to --on--.
 - b. It is noted that the preamble of claim 1 recites "A method of plating...on a substrate", but the limitations recited in the claims recite a "printed wiring board", not a "substrate". It is suggested that the claim be amended to

identify the printed wiring board as the substrate to provide agreement between the preamble and the body of the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-14 and 21-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In the amendment filed June 9, 2003, in claims 1 and 8, "interconnect" was "trace". The term "trace" is not supported or defined in the specification, and therefore, its use raises the issue of new matter. It is suggested that the term "trace" be changed back to --interconnect-- as originally presented. The same applies to dependent claims 2-7, 9-14 and 21-24.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1753

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-4, 7-11, 14 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koyama (U.S. Pat. No. 6,254,758) in view of Stern (U.S. Pat. No. 6,015,482).

Regarding claims 1 and 8, Koyama discloses a method for plating patterns on wiring boards, including multi-layer wiring boards, wherein the method comprises the following steps:

- a) Forming an interconnect **20a** on opposing sides of a wiring board **24** and through a via formed through the wiring board **24** (fig. 5(a)).
- b) Forming first and second dielectric layers **10** over the first and second sides of the wiring board **24**, wherein the dielectric layers **10** comprise openings **26** that expose portions of the underlying interconnect **20a** (figs. 4 and 5(b)).
- c) Forming first and second plating layers on the first and second dielectric layers, respectively, and on the sides of the openings and on the exposed portions of the metal interconnect **20a** (fig. 5(c)). The step of forming a plating layer is a part of the method for forming conductor patterns **20a** and **20b** (see col. 6, lines 54-60), wherein the process of forming the conductor patterns, as shown in Figure 1 comprises:
 - i) Forming an electroless plated copper layer (plating layer) **12** on the surface of the insulating layer **10**. As shown in Figure 1, the

electroless plated copper layer **12** is a continuous layer. When used for fabricating the conductor patterns **20a** in the method shown in Figures 5(a) to 5(e), the electroless layer would also plate on the exposed portions of the underlying conductor patterns (interconnect) **20a**.

- ii) Forming a resist **14**.
- iii) Electroplating a copper layer **16**.
- iv) Annealing.
- v) Etching the electroless plated copper layer **12** in areas not covered by the electroplated copper layers **16** to form conductor patterns **20** (col. 2, lines 25-37).

Regarding claims 2 and 9, the plating layers **12** are formed by electroless plating and the conductive layers **16** are formed by electroplating (col. 3, lines 31-50).

Regarding claims 7 and 14, the removal (etching) of portions of the electroless plated layers (plating layers) **12** occurs after electroplating has been carried out (fig. 1; col. 2, lines 25-37).

Regarding claims 21 and 23, since the openings **26** in the dielectric layers **10** are not formed above the vias, the plating layers **12** formed on the dielectric layers **10** are not formed in the vias (fig. 5(b)).

Regarding claims 22 and 24, the formation of conductor patterns **20a**, which corresponds to the electroplating of copper layers **16**, is confined substantially to the openings **26** of the dielectric layers **10** (figs. 4 and 5(e)).

The method disclosed by Koyama differs from the instant invention because Koyama does not teach the following:

- a. Forming first and second contact layers over portions of the plating layers using the plating layers, as recited in claims 1 and 8;
- b. Electroplating first and second contact layers includes electroplating first and second barrier layers over the plating layers, as recited in claims 3 and 10;
- c. Electroplating the barrier layers includes electroplating first and second nickel layers and further electroplating first and second gold layers on the first and second nickel layers, as recited in claims 4 and 11;

Stern discloses a method for fabricating contacts or surface mount pads on printed circuits wherein contacts are formed on copper patterns. The contacts are formed by electroplating nickel on a copper pattern, followed by electroplating gold on the nickel (col. 3, lines 8-21). Stern teaches, "Electroplating of nickel is required to prevent 'migration' of copper into the electroplated gold...[because] copper reduces the anti-corrosive properties of gold, which is essential to the integrity of printed circuit contacts, requiring exposed conductive leads" (col. 3, lines 12-21).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Koyama to form gold contacts on the plating layers as taught by Stern because gold contacts are anti-corrosive, which Stern teaches "is essential to the integrity of printed circuit boards, requiring exposed conductive leads" (col. 3, lines 17-21).

Art Unit: 1753

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method of Koyama to include a step of fabricating a barrier layer made of nickel as taught by Stern because the electroplating of nickel prevents the migration of copper into gold contacts and protects the anticorrosive properties of gold.

Allowable Subject Matter

8. Claims 5, 6, 12 and 13 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: The method of Koyama requires the formation of a patterned resist **14**, which is removed after the step of electroplating has occurred. Modifying the method of Koyama to remove the plating layer prior to electroplating or by forming a discontinuous plating layer would render the process inoperable because a continuous plating layer and a resist are required in the method of Koyama to provide an electrical path for the electrolytic plating of the copper layers **16**. The instant method would therefore limit the amount of the plating layer to be removed, which could help prevent damage to the electroplated layers.

Art Unit: 1753

Response to Arguments

10. The Applicant incorporated limitations that the Examiner indicated would overcome the rejections based on Lim (US 2001/0004489 A1). No arguments were provided in Applicant's response.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L. Mutschler whose telephone number is (703) 305-0180. The examiner can normally be reached on Monday-Friday from 8:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (703) 308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

blm
June 18, 2003